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High Energy Group**

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Kiester
Dear Prof. Tollefson,

I would like to recommend Dr. Veronica Sorin for a postdoctoral position in your group. I am a colleague of Veronica on the DØ experiment at the Fermilab Tevatron collider and I have worked directly with her at the time when she was pursuing her Ph.D. degree. The subject of Veronica's Ph.D. thesis was a measurement never performed before at a hadron collider, i.e. the measurement of dijet transverse thrust cross-sections. Thrust is an event shape variable very sensitive to higher order QCD corrections, and to resummation effects. The measurement of such variable is very complex, because of its sensitivity to jet energy reconstruction and detector noise. Veronica used the k_T jet algorithm for the analysis and she was one of the main contributors to the understanding of such algorithm within the experiment. She worked in close contact with several theorists for the comparison of her results with QCD calculations.

I worked directly with Veronica, in the context of the alignment of the DØ Silicon Microvertex Tracker (SMT). Between 1998 and 2001, I was in charge of coordinating the Software and Algorithm group for the new DØ SMT. Such group was in charge of defining algorithms, designing and implementing the code for the simulation and the reconstruction of events recorded by the SMT, at the highest trigger level, and at the offline reconstruction level.

One of the projects of the SMT Software and Algorithm group was the definition of the actual geometry of the SMT, for the trigger and offline reconstruction, based on the results of the initial engineering survey, and of any of the subsequent corrections calculated from reconstructed events/tracks. Veronica worked on the design and implementation of the code which stores all alignment constants and translates them in a geometry description for the SMT. The SMT is a fairly complicated device, from many points of view, including its geometry. It consists of several different kinds of silicon wafers, arranged in concentric barrels, and intermediate parallel disks. All elements (single wafers, barrel and disk assemblies) were surveyed at Fermilab using CCD machines and local coordinate systems. The maze of measurements had to be related to each other and assembled in one consistent geometrical structure, described in terms of the DØ main coordinate system (tied to the main DØ detector). The description also had to be flexible enough to support further corrections (the first alignment constants come from the initial survey, but they are later corrected as a results of an iterative process which uses recorded data, and fully reconstructed tracks). Veronica approached the project with excellent skills in C++ programming and soon mastered the use of Oracle databases (including scripting techniques and designer tools). She designed the database structure, interfaced it to the input data



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U N I V E R S I T Y

(against which she had to apply complicated geometrical transformations, in order to tie all measurements to a unique reference frame), and to the output, i.e. the reconstruction and trigger geometry description. She implemented the database design, and tested its performance on data reconstruction. She then took the responsibility, with a small group of people, to use reconstructed tracks to align the SMT relatively to the central fiber tracker, within which the SMT is housed. This was a significant contribution to a key item in the commissioning of the DØ detector. She presented the first results of the alignment in an impeccably clear talk to the collaboration.

Veronica had to interact with many people in order to carry out her alignment projects. She had to work in close contact with the hardware groups that built the SMT barrel and disk structures, and with the software groups which oversee the development of SMT-specific software, and the general DØ alignment software. She also worked extensively with the Fermilab Computer Division support group on databases. In fact, in order to carry out the project as successfully as she did, she had to act as the connection between all of the above groups. I was truly impressed that she managed to work so well, with so many different people, as a young student. Having seen Veronica's contributions to so many different areas of the experiment, I can definitely say that she ranks among best students who have graduated out of DØ, and I believe she is a very strong candidate for your position.

Please do not hesitate to contact me if I can be of further assistance.

Sincerely,

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